

ECE 487/687 CARDIOVASCULAR ENGINEERING

Dr. Ewert, EE101B Dan.Ewert@NDSU.edu

COURSE DESCRIPTION

This course includes the application of engineering techniques to cardiovascular physiology and medicine. Basic cardiac and vascular physiology will be presented, modeling techniques will be examined. Instrumentation, measurement theory, and assist devices will be discussed.

COURSE OBJECTIVES

At the conclusion of the course the student should have an understanding of basic cardiac and vascular physiology, modeling techniques, instrumentation, measurement theory, and assist devices and the ability to practically apply this knowledge.

TYPICAL CLASS SCHEDULE

<u>Week / Date</u>	<u>Objectives</u>	<u>Assignments</u>
1	Grading, Introduction	
2	Cardiac, Vascular Anatomy	
3	Excitation-contraction , Depolarization	
4	ECG,Pacemaker and Defibrillator Basics	Pacemaker / Defib Design
5	Review, Test 1	
6	Basic Physiological Concepts	
7	Heart as Pump	
8	Advanced Cardiac Concepts	
9	Advanced Cardiac Concepts	
10	SPRING BREAK	
11	Cardiovascular coupling	
12	Cardiovascular coupling	
13	Review, Test 2	
14	Measurement theory	
15	Pressure, Flow, Volume Measurements	
16	LVAD/CAD/Art. Heart Basics	
17	Review, Test 3	

REFERENCES: <http://venus.ece.ndsu.nodak.edu/ece/facilities/labs/cvlab/pub.htm>

GRADING	Undergraduates	Graduates
Tests (3)	50%	40%
Homework	10%	10%
Labs	10%	10%
Project(s)	0%	15%
Instructor Discretion	10%	10%
Final	20%	15%

- 1) Grades are usually established on a $A \geq 90\%$, $89\% \geq B \geq 80\%$, $79\% \geq C \geq 70\%$, $69\% \geq D \geq 60\%$, $F \leq 59\%$, but can vary depending on relative difficulty of tests from semester to semester. See attached grading sheet.
- 2) Typical clock hours for labs might be 5 hours, but varies depending on the difficulty and number of problems assigned by industry contacts
- 3) Any students with disabilities who need accommodations are encouraged to speak with the instructor as soon as possible to make arrangements for these accommodations.
- 4) All work in this course must be completed in a manner consistent with NDSU University Senate Policy, Section 335: Code of Academic Responsibility and Conduct (<http://www.ndsu.nodak.edu/policy/335.htm>)